

Tennessee Educational Technology Plan 2003-2006

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Appendix A: History

In July 1996, Tennessee's State Board of Education issued its Education Technology Long-Range Plan. Subsequently, the Board incorporated Goals, Strategies, and Measures for Technology into its annual Master Plan for Tennessee Schools under Key Result Area 4¹. In 1997, Tennessee applied for and received federal block grant funds under ESEA Title III Part A to implement a competitive technology grant program. As required with the application for those federal funds from ESEA, Tennessee submitted a technology plan that was specific to the uses of those funds.

On a parallel path, the Department of Education publishes its annual Information Systems Plan to delineate the mission, strategies, and projects of the information services division of the department. This plan is responsive to the requirements of the Office of Information Resources (OIR) which operates within the Department of Finance and Administration whose role in state government "is to provide continually improving financial and administrative support services which enhance state government's ability to improve the quality of life for Tennesseans."²

Early state education technology initiatives began with a curriculum program called Computer Skills Next which was part of Lamar Alexander's inaugural motto for his second term: "Basic skills, first, computer skills next, new job skills for all Tennesseans." (1983)³ The program was piloted in the 1984-85 school year, funding computers and a Computer Skills Next curriculum for seventh and eighth graders, with districts allowed to purchase additional equipment off the state contract. The curriculum provided a graduated introduction of technology curriculum and grew into the curriculum standards for grades 5-8 and then K-4. The standards were revised in 1996 for the K-12 span and have since evolved into the technology frameworks.⁴

The state's 21st Century Classroom program was adopted in 1992 which provided districts (who also contributed funds) with classroom equipment and teacher training at a cost of \$20,000 per classroom. According to John Sharp, Budget Director for the Department of Education, the fiscal year 1993-94 appropriation for the 21st Century Classrooms was \$66,959,000. The money was not to revert at the end of the fiscal year but was to remain available in the form of a carry forward for the program.⁵

Beginning as a bicentennial project in 1995-6, the ConnecTEN initiative brought national attention to Tennessee as it became the first state in the nation to connect all of its public schools and libraries to the Internet. Eight education consultants working within the department in the Division of Curriculum and Instruction provided professional development to local educators at regional computer labs situated in three of the department's six regional offices.

The technology plan embedded in the state's application for the Title III Part A technology funds was designed to augment the impact of the ConnecTEN classroom internet presence while it engaged teachers across the state in learning to teach using resources from the Internet. The implementation plan made use of the regional technology training labs.

¹ <http://www.state.tn.us/sbe/master.htm>

² <http://www.state.tn.us/finance/> (Retrieved 22 October 2002)

³ "Computer skills next and Tennessee", viewed online Lexis/Nexis October 2002

⁴ Private notes from interview with Morgan Branch, Office of Curriculum and Instruction, 2002.

⁵ Email communication, October 24, 2002

The 1997 plan delineated the following goals which were addressed through what was known as the Technology Literacy Grant (TLG) grant program:

- All K-12 Tennessee public schools will use the existing technology available to have access to the world's libraries, databases, and content through classroom, library and laboratory connections.
- All students and teachers in Tennessee will develop basic skills, perform research and solve problems through the Internet and instructional software resources.
- All teachers will be prepared and trained to use instructional technology, incorporating it effectively into the curriculum.
- Use technology to facilitate reconnecting communities to their schools.

In 2001, the goals being addressed by the Title III Part A TLG competitive grants were deemed met within the extent possible with the existing competitive program design.⁶ Widespread use of the internet was evident; over 18,000 "units" using the Internet had been created; but widespread use of technology for instructional purposes by the majority of teachers was less evident. At that juncture, the legislature was no longer appropriating funds for the 21st Century Classroom program. To fund technology, local systems relied upon local funding, grant opportunities, and sometimes using portions of their Basic Education Program (BEP) allotment.

Hence, the department undertook a major revision of the competitive grant program for the final year of the Title III Part A funding period. The Technology Literacy Challenge Fund (TLCF) pilot program that ensued was designed to investigate what it took to engage an entire faculty in the integrated use of technology as part of everyday teaching and learning. A key component of the pilot program was the introduction of an indigenous, full-time, campus-level technology coach engaged in working directly with all teachers in facilitating their use of technology as an instructional tool. The pilot program was poised to establish a core group of schools across the state with the capacity of serving as technology integration models. If the pilot program succeeded, then teachers in the vicinity of the pilot schools would have a place to observe to see what "technology integration" looks like in the classroom. If the pilot program succeeded, then Tennessee would have the beginnings of local professional development communities poised to serve their neighboring K-12 communities in a cooperative structure.

A strategic update to the technology plan that served the original Title III Part A grant program is certainly overdue. But a strategic education technology plan should do more than simply respond to the federal mandates. It should seek to embrace the greater goals delineated by the State Board of Education as well as the new initiatives to be undertaken by the new administration.

The resulting strategic educational technology plan must be reviewed regularly at intervals established at the outset in order that it be aligned with initiatives and responsive to emerging needs. The plan is not intended to be simply a response to the federal requirement of the Enhancing Education Through Technology Act (No Child Left Behind, Title II Part D). Rather, it is expected to set the course for technology as a teaching and learning tool in the classrooms of Tennessee in an era when technology is a fast-moving and critical player in today's society.

In addition to the Educational Technology Plan, the state will continue to prepare its annual Information Systems Plan that conforms to the requirements of the state's Office of Information Resources (OIR). It is unclear whether the two documents can or should be either merged or presented as complementary documents.

⁶ In 2001, the department also reassigned its education technology consultants from their training duties to other responsibilities in the regional offices.

Appendix B: Tennessee STaR Chart



Tennessee STaR Chart:
A Tool for Planning and Assessing
School Technology and Readiness

	I. TEACHING AND LEARNING						II. EDUCATOR PREPARATION AND DEVELOPMENT					
	(A) Impact of Technology on Teacher Role and Collaborative Learning	(B) Patterns of Teacher Use of Technology	(C) Frequency/ Design of Instructional Setting Using Digital Content	(D) Curriculum Areas	(E) Technology Applications Assessment	(F) Patterns of Student Use of Technology	(G) Content of Training	(H) Capabilities of Educators	(I) Leadership Capabilities of Administrators	(J) Models of Professional Development	(K) Levels of Understanding and Patterns of Use	(L) Technology Budget Allocated to Technology Professional Development
Early Tech (1 pt)	Teacher-centered lectures Students use technology to work on individual projects	Use technology as a supplement	Occasional computer use in library or computer lab setting	No technology use or integration occurring in the core curriculum subject areas	<i>Campuses that serve grades K-8:</i> Within each grade level cluster (K-2, 3-5, 6-8), some but not all Technology standards are met <i>High School Campuses:</i> At least 4 Technology Applications courses offered	Students occasionally use software applications and/or use tutorial software for drill and practice	Technology literacy skills including multimedia and the Internet	10% meet ISTE technology proficiencies and implement in the classroom	Recognizes benefits of technology in instruction; minimal personal use	Whole group	Most at entry or adoption stage (Students learning to use technology; teachers use technology to support traditional instruction)	5% or less
Developing Tech (2 pts)	Teacher-directed learning Students use technology for cooperative projects in their own classroom	Use technology to streamline administrative functions (i.e., grade book, attendance, word processing, E-mail, etc.)	Regular weekly computer use to supplement classroom instruction, primarily in lab and library settings	Use of technology is minimal in core curriculum subject areas	<i>Campuses that serve grades K-8:</i> Within each grade level cluster (K-2, 3-5, 6-8), most Technology standards are met <i>High School Campuses:</i> At least 4 Technology Applications courses offered and at least 2 taught	Students regularly use technology on an individual basis to access electronic information and for communication and presentation projects	Use of technology in administrative tasks and classroom management; use of Internet curriculum resources	40% meet ISTE technology proficiencies and implement in the classroom	Expects teachers to use technology for administrative and classroom management tasks; uses technology in some aspects of daily work	Whole group, with follow-up to facilitate implementation	Most at adaptation stage (Technology used to enrich curriculum) Most beginning to use with students	6-24%
Advanced Tech (3 pts)	Teacher facilitated learning Students use technology to create communities of inquiry within their own community	Use technology for research, lesson planning, multimedia and graphical presentations and simulations, and to correspond with experts, peers, and parents	Regular weekly technology use for integrated curriculum activities utilizing various instructional settings (i.e., classroom computers, libraries, labs, and portable technologies)	Technology is integrated into core subject areas, and activities are separated by subject and grade	<i>Campuses that serve grades K-8:</i> Within each grade level cluster (K-2, 3-5, 6-8), all Technology standards are met Grade-level benchmarks (K-8) are established <i>High School Campuses:</i> At least 4 Technology Applications courses offered and at least 4 taught	Students work with peers and experts to evaluate information, analyze data and content in order to problem solve Students select appropriate technology tools to convey knowledge and skills learned	Integration of technology into teaching and learning; regularly uses internet curriculum resources to enrich instruction	60% meet ISTE technology proficiencies and implement in the classroom	Recognizes and identifies exemplary use of technology in instruction; models use of technology in daily work	Long term and ongoing professional development; involvement in a developmental/ improvement process	Most at appropriation stage (Technology is integrated, used for its unique capabilities)	25-29%
Target Tech (4 pts)	Teacher as facilitator, mentor, and co-learner Student-centered learning, teacher as mentor/facilitator with national /international business, industry, university communities of learning	Integration of evolving technologies transforms the teaching process by allowing for greater levels of interest, inquiry, analysis, collaboration, creativity and content production	Students have on-demand access to all appropriate technologies to complete activities that have been seamlessly integrated into all core curriculum areas	Technology is integral to all subject areas	<i>Campuses that serve grades K-8:</i> Within each grade level cluster (K-2, 3-5, 6-8), all Technology standards are met Grade-level benchmarks (K-8) are met <i>High School Campuses:</i> All Technology Applications courses offered with a minimum of 4 taught, or included as new courses developed as local elective or included as independent study course	Students work collaboratively in communities of inquiry to propose, assess, and implement solutions to real world problems Students communicate effectively with a variety of audiences	Regular creation and communication of new technology-supported, learner-centered projects; vertical alignment of all Technology Application curriculum standards; anytime anywhere use of Internet curriculum resources by entire school community	100% meet ISTE technology proficiencies and implement in the classroom	Ensures integration of appropriate technologies to maximize learning and teaching; involves and educates the school community around issues of technology integration	Creates communities of inquiry and knowledge building; anytime learning available through a variety of delivery systems; individually guided activities	Most at invention stage (Teachers discover and accept new uses for technology)	30% or more
	Total Points for Teaching and Learning						Total Points for Educator Preparation and Development					

	III. ADMINISTRATION AND SUPPORT SERVICES					IV. INFRASTRUCTURE FOR TECHNOLOGY				
	(M) Vision and Planning	(N) Technical Support	(O) Instructional and Administrative Staffing	(P) Budget	(Q) Funding	(R) Students per Computer	(S) Internet Access Connectivity/Speed	(T) Distance Learning	(U) LAN/WAN	(V) Other Technologies
Early Tech (1 pt)	No campus technology plan; technology used mainly for administrative tasks such as word processing, budgeting, attendance, grade books	No technical support on-site; technical support call-in; response time greater than 24 hours	No full time dedicated district level Technology Coordinator Campus educator serving as local technical support	Campus budget for hardware and software purchases and professional development	Local fund raisers only	Ten or more students per Internet-connected multimedia computer Refresh cycle established by district/campus for every 6 or more years	Dial-up connectivity to the Internet available only on a few computers	No Web based/online learning available at the campus No satellite based learning available at the campus No two-way interactive video distance learning capabilities available at the campus	Limited print/file sharing network at the campus Some shared resources available on the campus LAN	Shared use of resources such as, but not limited to, TVs, VCRs, digital cameras, scanners, classrooms sets of programmable calculators
Developing Tech (2 pts)	Campus technology plan aligns with the TN Long Range Technology Plan; integrated into district plan; used for internal planning, budgeting, applying for external funding and discounts. Teachers/administrators have a vision for technology use for direct instruction and some student use	At least one technical staff to 750 computers Centrally deployed technical support call-in; response time less than 24 hours	Full-time district level Technology Coordinator/Assistant Superintendent for Technology Centrally located instructional technology staff; one for every <u>5,000</u> students Additional staff as needed, such as trainer, webmaster, network administrator	Campus budget for hardware and software purchases and professional development, <u>minimal</u> staffing support, and some ongoing costs	Fund raisers and minimum grants/minimal local funding	Between 5 and 9 students per Internet-connected multimedia computer Refresh cycle established by district/campus is every 5 years	Direct connectivity to the Internet available at the campus in 50% of the rooms, including the library Adequate bandwidth to the campus to avoid most delays	Web-based/on-line learning available at the campus Satellite based learning available at the campus No two-way interactive video distance learning capabilities available at the campus, but available in the district	Most rooms connected to the LAN/WAN with student access Minimum 10/100 Cat 5 hubbed network High-end servers, such as Novell or NT servers, serving some applications	One educator per computer Shared use of resources such as TVs, VCRs, digital cameras, scanners, digital projectors, and analog video cameras; classrooms sets of programmable calculators
Advanced Tech (3 pts)	In addition to the above, the campus technology plan is approved by the board and supported by Director of Schools Campus plan collaboratively developed, guiding policy and practice; regularly updated Campus plan addresses technology application essential knowledge and skills and higher order teaching and learning Administrators use technology tools for planning	At least one technical staff to 500 computers Central technology support use remote management software tools Centrally deployed and minimal campus-based technical support on-site; response time is less than 8 hours	Full-time district level Technology Coordinator/Assistant Superintendent for Technology Centrally located instructional technology staff; one for every <u>1,000</u> students Additional staff as needed	Campus budget for hardware and software purchases and professional development, <u>adequate</u> staffing support, and ongoing costs	Grants, E-Rate discounts applied to technology budget, <u>locally supplemented</u> through tax dollars	Four or less students per Internet-connected multimedia computer. Replacement cycle established by district/campus is every 4 years	Direct connectivity to the Internet in 75% of the rooms, including the library Adequate bandwidth to each classroom over the local area network (at least 10/100 MB LAN) to avoid most delays Easy access for students and teachers	Web-based/on-line learning available at the campus Satellite-based learning available at the campus Two-way interactive video distance learning capabilities available in at least one classroom	<u>All rooms</u> connected to the LAN/WAN with student access Minimum 10/100 Cat 5 switched network High-end servers, such as Novell or NT servers, serving multiple applications	One educator per computer Dedicated and assigned use of commonly used technologies such as computers with projection devices, TVs, VCRs, programmable calculators assigned to each student, and telephones in each classroom <u>Shared use of specialized technologies</u> such as digital cameras, scanners, document cameras and projectors, and digital video cameras
Target Tech (4 pts)	In addition to the above, the campus technology plan is actively supported by the board Campus plan is collaboratively developed, guiding policy and practice; updated at least annually The campus plan is focused on student success; based on needs, research, proven teaching and learning principles. Administrators use technology tools for planning and decision making	At least one technical staff to 350 computers; centrally deployed and dedicated campus-based Central technology support use remote management software tools Technical support on-site; response time is less than 4 hours	Full-time district level Technology Coordinator/Assistant Superintendent for Technology <u>Dedicated</u> campus-based instructional technology support staff— <u>one per campus plus one for every 1,000 students</u> Additional staff as needed	Campus budget for hardware and software purchases, sufficient staffing support, costs for professional development, facilities and other ongoing costs <u>Appropriate</u> budget to support the district technology plan	Other competitive grants, E-Rate discounts, <u>locally supplemented</u> through tax dollars Other state and federal programs directed to support technology funding, bond funds, business partnerships, donations, foundations, and other local funds designated for technology	In addition to 4 or less students per Internet-connected multimedia computer, on-demand access for every student. Replacement cycle established by district/campus is 3 or less years	Direct connectivity to the Internet in all rooms on all campuses Adequate bandwidth to each classroom over the local area network (at least 100 MB or fiber <u>network LAN</u>) Easy access for students and teachers <u>including</u> some wireless connectivity	Web-based/on-line learning available at the campus Satellite-based learning available at the campus Two-way interactive video distance learning capabilities available at the campus in multiple classrooms	All rooms connected to the WAN sharing multiple district-wide resources Campus is connected to robust WAN with <u>100 MB/GB</u> and/or fiber <u>switched network</u> that allows for resources such as, but not limited to, video streaming and desktop videoconferencing <u>Easy access</u> to network resources for students and teachers, <u>including</u> some wireless connectivity	One educator per computer Fully equipped classrooms with all the technology that is available to enhance student instruction readily available including all of the above as well as the use of new and <u>emerging</u> technologies
	Total Points for Administration and Support Services					Total Points for Infrastructure for Technology				

The Tennessee STaR Chart will help schools and districts answer some critical questions:

1. What are your school's and district's current educational technology profiles?
2. What evidence can be provided to demonstrate their progress in meeting long-range technology goals?
3. What areas should your school and district focus on to improve its level of technology integration to ensure the best possible teaching and learning?

The Tennessee STaR Chart can be used:

- ★ To create and/or to update the district's Technology Plan
- ★ To set benchmarks and goals. Schools and districts may use the chart to identify current education technology profiles, establish goals, and monitor progress.
- ★ To create individualized assessment tools. Education administrators and policymakers may use the Tennessee STaR chart as the basis for technology assessments and to evaluate varied perspectives of different staff and clientele.
- ★ To apply for grants. The Tennessee STaR chart will help schools identify their educational technology needs as they apply for grants.
- ★ To determine funding priorities. Education administrators and policymakers can use the Tennessee STaR Chart to determine where to allocate funds.
- ★ To use the Tennessee STaR Chart for a historical perspective. Schools and districts can complete the survey and then use the profile annually to gauge their progress. The data can be reported to school boards, and community, school or district planning committees to gauge progress and align with national and state standards.
- ★ To help conceptualize your school's or district's vision of technology

Stages of Professional Development (CEO Forum STaR Chart)

Entry/Adoption Stage. Educators move from the initial struggles to learn the basics of using technology to successful use of technology on a basic level (e.g., integration of drill and practice software into instruction).

Adaptation Stage. Educators move from basic use of technology to discovery of its potential for increased productivity (e.g., use of word processors for student writing, and research on the Internet).

Appropriation Stage. Having achieved complete mastery over the technology, educators use it effortlessly as a tool to accomplish a variety of instructional and management goals.

Invention Stage. Educators are prepared to develop entirely new learning environments that utilize technology as a flexible tool. Learning becomes more collaborative, interactive and customized.

Tennessee STaR Chart Scoring Table

Section	Total Numeric Score	Look up the total points for section in the chart to determine the "Level of Progress"				Level of Progress
		Early Tech	Developing	Advanced	Target	
I: Teaching and Learning		6-8	9-14	15-20	21-24	
II: Educator Preparation and Development		6-8	9-14	15-20	21-24	
III: Administration and Support Services		5-7	8-12	13-17	18-20	
IV: Infrastructure for Technology		5-7	8-12	13-17	18-20	

Download STaR Chart from

<http://www.state.tn.us/education/acctstar-campus-portrait.doc>



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The Tennessee STaR chart is incorporated each year into Tennessee's building level E-TOTE survey. See www.state.tn.us/education/acctetote.htm to link to annual E-TOTE reports and survey instruments.



International Society for Technology in Education
National Education Technology Standards (NETS) for Students, Teachers, and Administrators
www.iste.org

NETS Student Standards: http://cnets.iste.org/students/s_stands.html

NETS Teacher Standards w. performance profiles
http://cnets.iste.org/teachers/t_stands.html (handout)
<http://cnets.iste.org/teachers/pdf/page09.pdf>

NETS Administrator Standards: http://cnets.iste.org/administrators/a_stands.html

TN Standards from <http://www.state.tn.us/education/ci/cicurframwkmain1.htm> (to be revised)

Kindergarten-Second Grade Technology Profile:

What percent of all the current second grade students in your school have demonstrated competence in the following second grade expectations?

1. Use input devices (e.g., mouse, keyboard, remote control) and output devices (e.g., monitor, printer) to successfully operate computers, VCRs, audiotapes, and other technologies.
2. Use a variety of media and technology resources for directed and independent learning activities.
3. Communicate about technology using developmentally appropriate and accurate terminology.
4. Use developmentally appropriate multimedia resources (e.g., interactive books, educational software, elementary multimedia encyclopedias) to support learning.
5. Work cooperatively and collaboratively with peers, family members, and others when using technology in the classroom.
6. Demonstrate positive social and ethical behaviors when using technology.
7. Practice responsible use of technology systems and software.
8. Create developmentally appropriate multimedia products with support from teachers, family members, or student partners.
9. Use technology resources (e.g., puzzles, logical thinking programs, writing tools, digital cameras, drawing tools) for problem solving, communication, and illustration of thoughts, ideas, and stories.
10. Gather information and communicate with others using telecommunications, with support from teachers, family members, or student partners.

For the answers provided about Xth grade student technology literacy, what was the primary method you used to determine the percentages?

- 1=No organized way to ascertain the information
- 2=Estimates based on teacher informal reporting
- 3=Student self-reported skills checklist
- 4=Teacher informal observation using skills checklist
- 5=Site-developed technology literacy test
- 6=End-of-experience test for technology application experience/course
- 7=Performance-based authentic assessment (portfolios)

Third-Fifth Grade Technology Profile:

What percent of all the current fifth grade students in your school have demonstrated competence in the following fifth grade expectations?

1. Use keyboards and other common input and output devices (including adaptive devices when necessary) efficiently and effectively.
2. Discuss common uses of technology in daily life and the advantages and disadvantages those uses provide.
3. Discuss basic issues related to responsible use of technology and information and describe personal consequences of inappropriate use.
4. Use general purpose productivity tools and peripherals to support personal productivity, remediate skill deficits, and facilitate learning throughout the curriculum
5. Use technology tools (e.g., multimedia authoring, presentation, Web tools, digital cameras, scanners) for individual and collaborative writing, communication, and publishing activities to create knowledge products for audiences inside and outside the classroom.
6. Use telecommunications efficiently and effectively to access remote information, communicate with others in support of direct and independent learning, and pursue personal interests.
7. Use telecommunications and online resources (e.g., e-mail, online discussions, Web environments) to participate in collaborative problem-solving activities for the purpose of developing solutions or products for audiences inside and outside the classroom.
8. Use technology resources (e.g., calculators, data collection probes, videos, educational software) for problem-solving, self-directed learning, and extended learning activities.
9. Determine when technology is useful and select the appropriate tool(s) and technology resources to address a variety of tasks and problems
10. Evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources.

Sixth-Eighth Grade Technology Profile:

What percent of all the current eighth grade students in your school have demonstrated competence in the following eighth grade expectations?

1. Apply strategies for identifying and solving routine hardware and software problems that occur during everyday use.
2. Demonstrate knowledge of current changes in information technologies and the effect those changes have on the workplace and society.
3. Exhibit legal and ethical behaviors when using information and technology, and discuss consequences of misuse.
4. Use content-specific tools, software, and simulations (e.g., environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research.
5. Apply productivity/multimedia tools and peripherals to support personal productivity, group collaboration, and learning throughout the curriculum.
6. Design, develop, publish, and present products (e.g., Web pages, video tapes) using technology resources that demonstrate and communicate curriculum concepts to audiences inside and outside the classroom.
7. Collaborate with peers, experts, and others using telecommunications and collaborative tools to investigate curriculum-related problems, issues, and information, and to develop solutions or products for audiences inside and outside the classroom.
8. Select and use appropriate tools and technology resources to accomplish a variety of tasks and solve problems.
9. Demonstrate an understanding of concepts underlying hardware, software, and connectivity, and of practical applications to learning and problem solving.
10. Research and evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources concerning real-world problems.

Ninth-Twelfth Grade Technology Profile:

What percent of all the current twelfth grade students in your school have demonstrated competence in the following twelfth grade expectations?

1. Identify capabilities and limitations of contemporary and emerging technology resources and assess the potential of these systems and services to address personal, lifelong learning, and workplace needs.
2. Make informed choices among technology systems, resources, and services.
3. Analyze advantages and disadvantages of widespread use and reliance on technology in the workplace and in society as a whole.
4. Demonstrate and advocate for legal and ethical behaviors among peers, family, and community regarding the use of technology and information.
5. Use technology tools and resources for managing and communicating personal/professional information (e.g., finances, schedules, addresses, purchases, correspondence).
6. Evaluate technology-based options, including distance and distributed education, for lifelong learning.
7. Routinely and efficiently use online information resources to meet needs for collaboration, research, publications, communications, and productivity.
8. Select and apply technology tools for research, information analysis, problem-solving, and decision-making in content learning.
9. Investigate and apply expert systems, intelligent agents, and simulations in real-world situations.
10. Collaborate with peers, experts, and others to contribute to a content-related knowledge base by using technology to compile, synthesize, produce, and disseminate information, models, and other creative works.